AGENDA

SPECIAL COMMITTEE ON ENERGY CONTRACTS AND RELATED PROJECTS

September 26, 2006 **5:00 PM**
Aldermen Thibault, Lopez, **Aldermanic Chambers**
Forest, Garrity, Long **City Hall (3rd Floor)**

1. Chairman Thibault calls the meeting to order.

2. The Clerk calls the roll.

3. Communication from Mayor Guinta submitting a plan to terminate the Aggregation program.
(Note: referred back to Committee by the Board on 09/05/2006.)
Gentlemen, what is your pleasure?

4. Communication from the NH Sierra Club seeking the City's support of the Cool Cities program which addresses global warming by encouraging the implementation of smart energy solutions in local communities.
Gentlemen, what is your pleasure?

5. Any other energy-related business which may come before the Committee.

6. If there is no further business, a motion is in order to adjourn.

City of Manchester

Office of the Mayor
Hon. Frank C. Guinta

September 5, 2006

The Special Committee on Energy Projects
& Related Projects
One City Hall Plaza
Manchester, NH 03101

Dear Chairman Thibault:

During the FY2007 budget process, I indicated to the Board of Aldermen that I would be bringing forth a plan to terminate the Aggregation program. Although the program succeeded in its goals of saving energy dollars, the relevance of maintaining the program at this time seems impractical.

Therefore, attached please find an analysis which would close out this program. Based upon savings and cost projections, and after having had discussions with the City Enterprise Funds and the Finance Department, I am recommending the following actions:

1. The Enterprise Funds pay back their share of the Aggregation program by the end of FY2007;

2. The General Fund will pay back its share from the FY2006 Contingency Account;

3. The City will enter into negotiations with the School District to develop a plan to pay back its share of the Aggregation program.

I would ask that the Committee approve this policy and forward it to the Board of Mayor & Aldermen for final approval.

Sincerely,

Frank C. Guinta
Mayor

One City Hall Plaza • Manchester, NH 03101 • Fax: (603) 624-6576 • Phone: (603) 624-6500
www.ManchesterNH.gov

Calulation for Aggregation Fund Close-out

Department	Savings	
OYS	846	
BMD	44,568	
Tax	22	
Fire	38,414	
Police	45,878	
Health	12,157	
Traffic	27,756	
Welfare	1,640	
P&R	90,342	
Library	16,986	
Elderly	2,029	
Unknown	3,574	
Outdoor Lights	178,023	
		Share of Deficit
Airport	496,244	357,519.39
Water	367,984	265,114.50
Parks-ent	72,274	52,069.83
School	445,860	353,267.48
EPD	685,926	494,175.59
General Fund	389,963	280,948.98
Total	**2,458,251**	**1,803,095.77**

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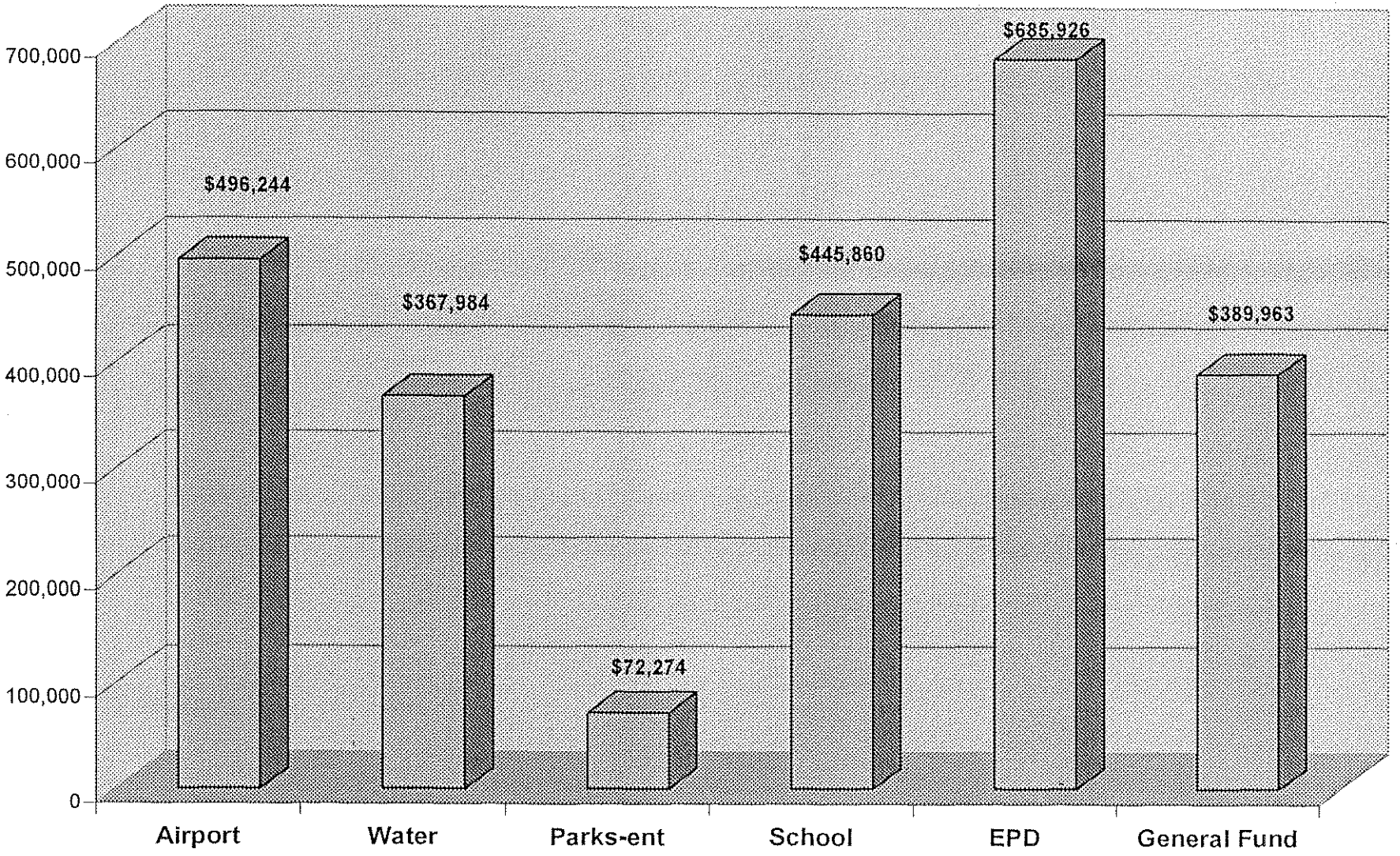
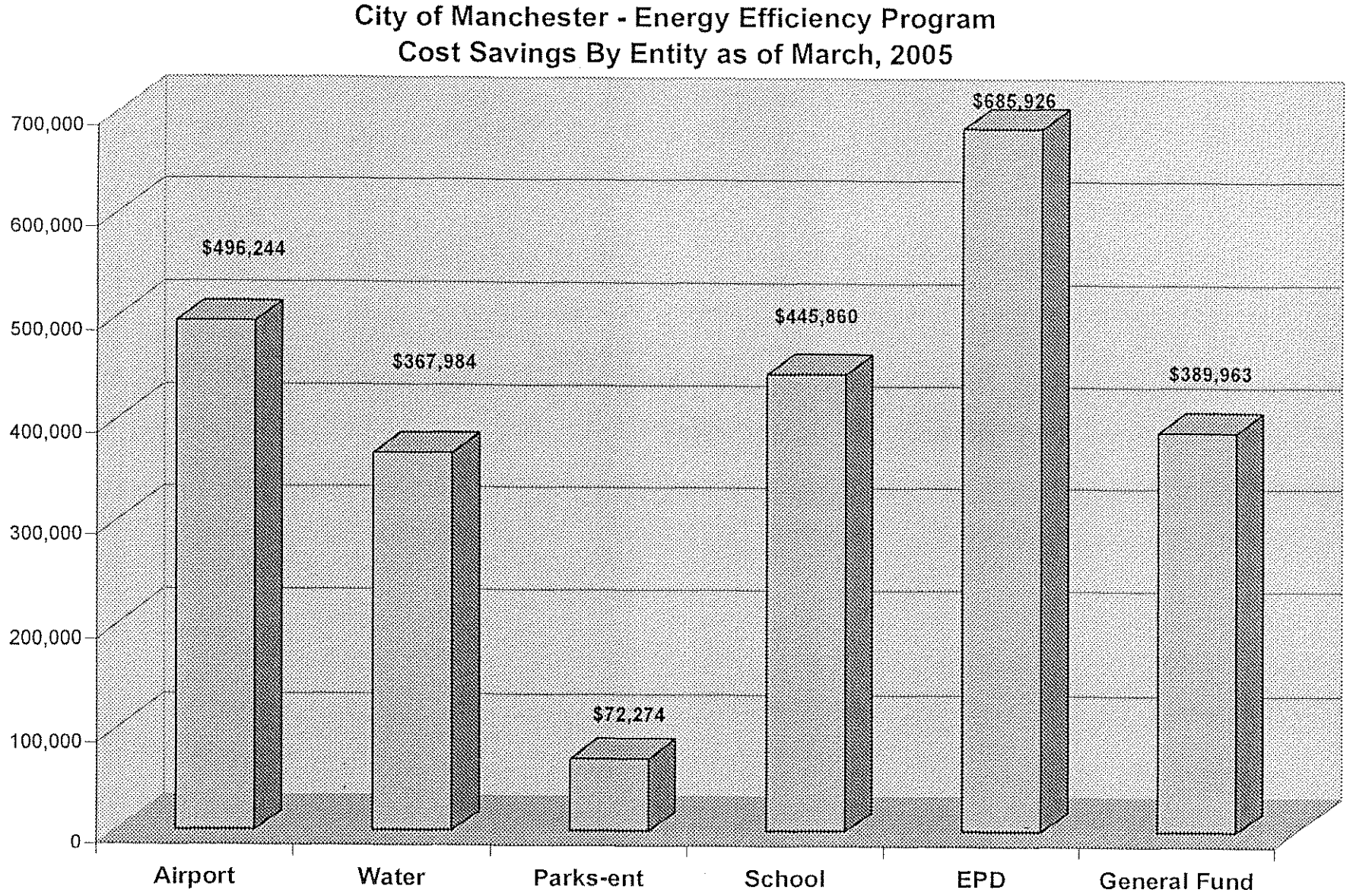
City of Manchester - Energy Efficiency Program
Cost Savings By Entity as of March, 2005




City of Manchester - Energy Efficiency Program
Cost Savings By Entity as of March, 2005
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
$496,244
$367,984
$72,274
$445,860
$685,926
$389,963
Airport
Water
Parks-ent
School
EPD
General Fund

3

Manchester Area Aggregation Program

Results of Energy Efficiency Projects
City of Manchester

	Date	Total Cost Savings ($/yr)	Implementation Cost ($)	Rebate ($)	Net Implementation Cost	Simple Payback (Years)	Cumulative Cost Savings To date	FEE
Center of NH Parking Garage								
Lighting Upgrades	6/1999 - 9/1/1999	**$5,614**	$38,622	$0	$38,622	6.9	**$39,390**	$539
Manchester Police								
Lighting Upgrades	10/1999 - 3/2000	**$2,995**	$8,339	$0	$8,339	2.8	**$19,521**	$169
Carpenter Library								
Lighting Upgrades	8/1999 - 2/2001	**$11,018**	$51,978	$3,000	$48,978	4.7	**$61,640**	$3,725
Fire Stations								
Lighting Upgrades	5/1999- 5/2001	**$24,977**	$109,982	$7,493	$102,489	4.4	**$133,644**	$20,222
IR Bay Heaters	5/1999- 6/2001	**$24,515**	$119,272	$0	$119,272	4.9	**$129,090**	$24,515
Hydronic Heating-Station 3		**$2,781**	$37,426	$0	$37,426	13.5	**$14,644**	
HVAC-Central Station	5/1999- 6/2001	**$14,265**	$248,674	$0	$248,674	17.4	**$75,116**	
Total Fire Stations		**$66,538**	$515,354	$0	$515,354	7.7	**$352,494**	
Information Systems								
Lighting Upgrades	4/2001- 5/2001	**$1,625**	$8,745	$1,565	$7,180	5.4	**$8,695**	$1,565
Building Services (Clay St)								
Lighting Upgrades	4/2001- 5/2001	**$1,558**	$3,639		$3,639	2.3	**$8,336**	
Water Treatment Facility								
Lighting Upgrades	6/1999- 6/2001	**$10,468**	$36,219		$36,219	3.5	**$55,122**	$12,643
Wastewater Treatment Facility								
Lighting Improvements	6/1999- 10/2001	**$68,038**	$236,852	$10,000	$226,852	3.5	**$335,530**	$13,668
Retube Incinerator Economizer	6/1999- 10/2001	**$153,804**	$112,030		$112,030	0.7	**$758,485**	
Parking Garages								
Lighting Upgrades - Canal Street	4/2001- 5/2002	**$15,721**	$33,195	$3,000	$30,195	2.1	**$68,397**	$3,000
Lighting Upgrades - Vine Street		**$9,523**	$28,810	$3,000	$25,810	3.0	**$41,432**	$3,000
Parks & Rec Maintenance Garage								
IR Bay Heaters	11/2002- 3/2003	**$8,881**	$26,009	$2,500	$23,509	2.9	**$31,242**	$8,881

	Date	Total Cost Savings ($/yr)	Implementation Cost ($)	Rebate ($)	Net Implementation Cost	Simple Payback (Years)	Cumulative Cost Savings To date	FEE
Manchester Police								
Dispatch lighting solution/upgrade	3/2003 - 4/2003		$293	$0	$293			
Firing Range lighting & testing environment program upgrade	3/2003 - 4/2003	**$1,897**	$5,718	$790	$4,928	3.0	**$6,512**	$897
Parks & Rec - WestSide & JFK Arenas								
Lighting Improvements Low E-Ceiling Desiccant Dehumidification Evaporative Condenser Ice Temperature Controllers	9/2002-7/2003	**$59,726**	**$313,474**	**$49,294**	**$264,180**	5.2	**$205,032**	$57,871
Rines Center								
Lighting Improvements-new HVAC Improvements New Boiler Lighting Improvements-retrofit	12/2002-12/2003	**$3,267**	$43,777	$7,516	**$36,261**	13.4	**$9,577**	$3,267
Verizon Wireless Arena								
Varible speed drives (5)	11/2002-10/2003	**$57,602**	$215,000	$50,000	**$165,000**	3.7	**$168,861**	$4,500
MAAP Current Projects:								
Police Station	2/2004-							
Lighting Improvements	6/2004	**$13,265**	$25,277	$573	**$24,704**	1.9	**$38,886**	$13,265
Garage Heaters	9/1/04 12/1/04	**$16,834**	$36,163	$12,110	**$24,053**	2.1	**$49,349**	$16,834
Gill Stadium	2/2004-							
Lighting Improvements	6/2004	**$2,385**	$15,658	$14,451	**$1,207**	6.6	**$6,992**	$2,385
School Gas Conversion	7/2003-6/1/05	**$32,048**	$325,772	$325,772	**$0**	10.2	**$93,949**	$32,048
MAAP Totals		**$542,807**	**$2,080,924**	**$491,064**	**$1,589,860**		**$2,359,442**	**$222,994**

New Hampshire Sierra Club
40 North Main Street, 2nd floor
Concord, NH 03301

August 28, 2006

Dear Aldermen:

The enclosed materials contain information about the Sierra Club's Cool Cities program, which addresses global warming by encouraging the implementation of smart energy solutions in local communities. The program calls for local officials to sign on to the U.S. Conference of Mayor's Climate Protection Agreement and reduce their city's carbon dioxide pollution seven percent below 1990 levels.

This program is sweeping the nation, with over 240 cities already participating. Many have already exceeded the Cool Cities goal, including Keene, New Hampshire. Hanover, Nashua and Dover are also part of the program and have begun to save energy and money. For example, as of May 2006 Nashua has saved $42,000 in energy costs just by switching its street lights and traffic lights to more energy efficient bulbs.

Manchester has begun taking some simple measures to save energy and, according to the mayor's office, the city is hiring an Americorps Vista to research ways the city can save energy. The city is planning a project to plant gardens on the rooftops of city buildings. This will keep cooling costs down in the summer, while the plants take carbon dioxide out of the atmosphere as they grow.

Mayor Baines endorsed the program last autumn and Mayor Guinta has indicated that he will continue the city's commitment, contingent upon support from the Board of Aldermen. As a "Cool City" Manchester would work to meet this goal with practical solutions that reduce waste and save money.

Please take a few minutes to look over the enclosed materials. Next week a Manchester volunteer of the Sierra Club will call you to answer questions and to schedule an appointment for a brief meeting.

Sincerely:

Sierra Club Volunteer

4

City of Seattle
Greg Nickels, Mayor

US Mayors Climate Protection Agreement

How many mayors have signed the Agreement?

As of January 29, 2006, 201 mayors representing over 41million Americans in 38 states and Washington, D.C.

What does the Agreement do?

Mayors who sign on to the Agreement are making a commitment to reduce greenhouse gas emissions in their own cities and communities to 7% below 1990 levels by 2012 through actions like increasing energy efficiency, reducing vehicle miles traveled, maintaining healthy urban forests, reducing sprawl and promoting use of clean, renewable energy resources. The Agreement also calls for Congress to pass legislation that sets meaningful timelines and limits on emissions through a flexible, market-based system of tradable allowances among emitting industries.

What does the USCM Resolution do?

The Resolution endorsed the US Mayors Climate Protection Agreement and urges all mayors to participate. It calls for a strong partnership between the USCM and the ICLEI Local Governments for Sustainability to help the growing number of participating cities implement the Agreement, and to track progress. The Resolution also encourages the federal government to assist cities in sharing best practices on local climate protection programs.

What's happened since the USCM meeting?

Cities throughout the country are working on climate action measures – from starting greenhouse gas inventories to implementing measures to reduce global warming pollution. In addition to the US Mayors Climate Protection Agreement, there's been a lot of other activity:

- Late in 2005, countries that are part of the Kyoto Accord met in Montreal at the major international conference on climate change and made a renewed commitment to meeting their targets. There was a lot of interest by the international community in the US Mayors Climate Protection Agreement.
- Governor Schwarzenegger (R-CA) announced an ambitious target and plan to reduce global warming pollution in California 11% by 2010, 25% by 2020, and 80% by 2050. If California were a country, it would rank 10th worldwide in greenhouse gas emissions.
- The Northeastern States Regional Greenhouse Gas Initiative (RGGI) agreed to a seven state cap-and-trade program for greenhouse gas emissions.
- Major business leaders, including several Fortune 500 Companies like GE and DuPont, have made strong commitments to clean energy and emissions reductions.

Why is this agreement important to mayors?

- They recognize that action on climate change is urgent, as cities throughout the US are already feeling the impacts of climate change. For instance, more intense and frequent storms and sea level rises are causing dangerous coastal flooding, and hydroelectric capacity and water supplies are less stable.
- Nine of the ten hottest years on record occurred in the last decade. People turn to their local governments first for help during droughts, dangerous heat waves, floods, and wildfires.
- Many actions that reduce global warming pollution provide additional benefits that are important to the quality of life in American cities, including cleaner air, decreased dependence on imported oil and gas, healthy urban forests and reduced energy bills.
- Mayors know that taking action now reduces the impacts – and costs – of climate change.
- Now is the time for reducing emissions to avoid even more significant global climate disruption. The US is nearly alone among industrialized countries in lacking a national policy and program on climate protection.

Visit www.seattle.gov/mayor/climate for more information, including participation forms, media coverage, and climate resource links.

What They're Saying

Mayors

"We're trying to do two things with the climate change agreement. The first is to generate local strategies for reducing greenhouse emissions. The second is to show support for these issues at the local level so that national leaders have the political support they need to do their part."
—Greg Nickels, Seattle, WA.

"This is not only an environmental issue, but also an economic development and sustainability issue. By protecting our environment, we are protecting our resources and preserving them for future generations to come."
—Joy Cooper, Hallandale Beach, FL

Media

"The mayors, both Democrats and Republicans, believe that the growing threat of global warming necessitates immediate action.... The mayors who signed the treaty believe the time has come to confront the issue of global warming and feel the treaty will not have deleterious effects on the economy."
—PBS NewsHour with Jim Lehrer, August 8, 2005

"The fact that there's a bandwagon at all is noteworthy, and the timing is fortuitous. As the Senate deliberates a number of bipartisan climate amendments that have been proposed for the energy bill, mayors from New York City to Salt Lake City are sending a powerful message to D.C. lawmakers that America wants action on global warming."
—Grist Magazine, June 15, 2005

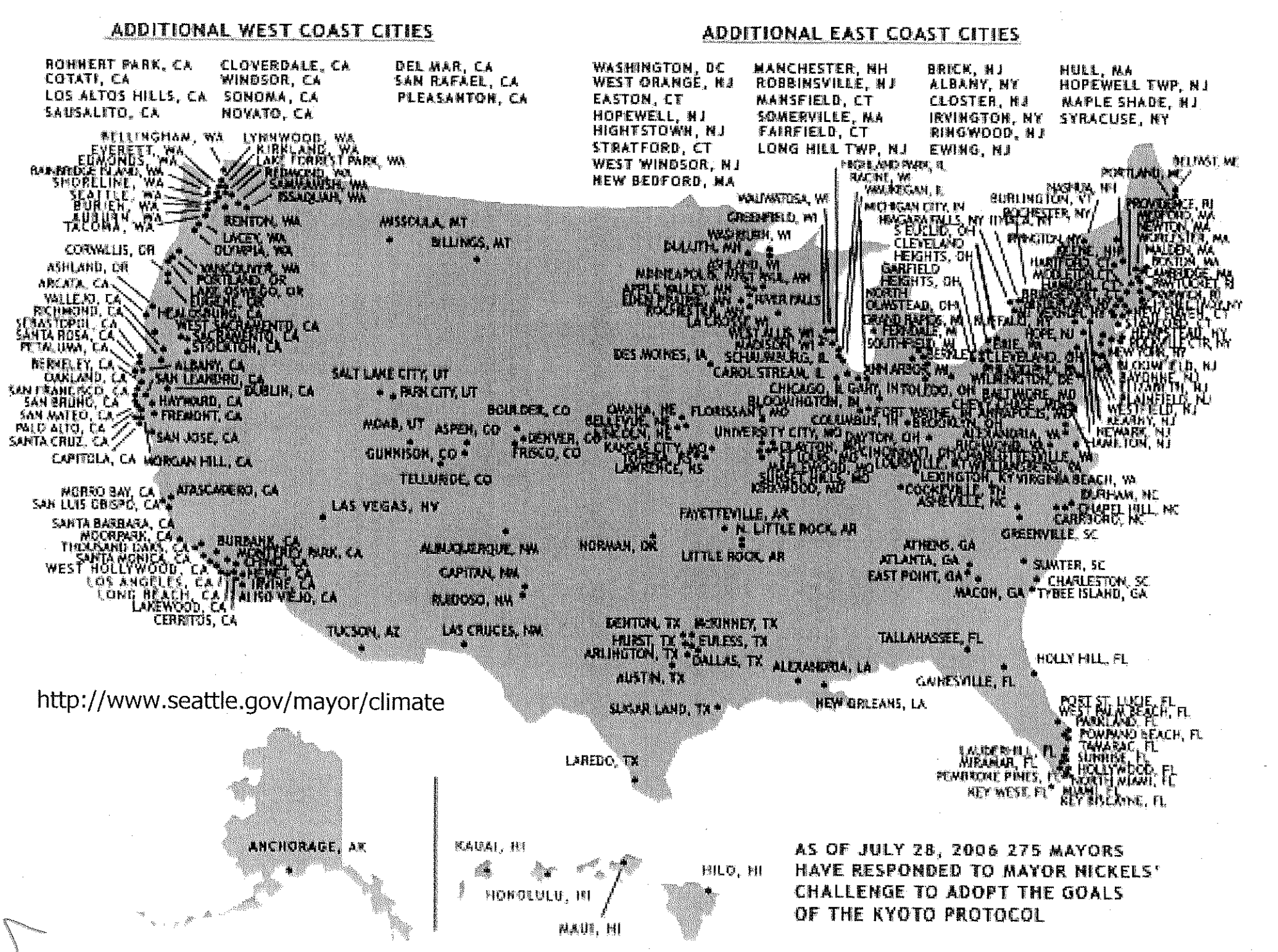
Ignoring inaction at the highest levels of the U.S. government, 145 mayors across the country have formed a coalition to combat global warming and begun to reshape their cities using innovative programmes and technologies.
—Inter Press Service News Agency, July 19, 2005

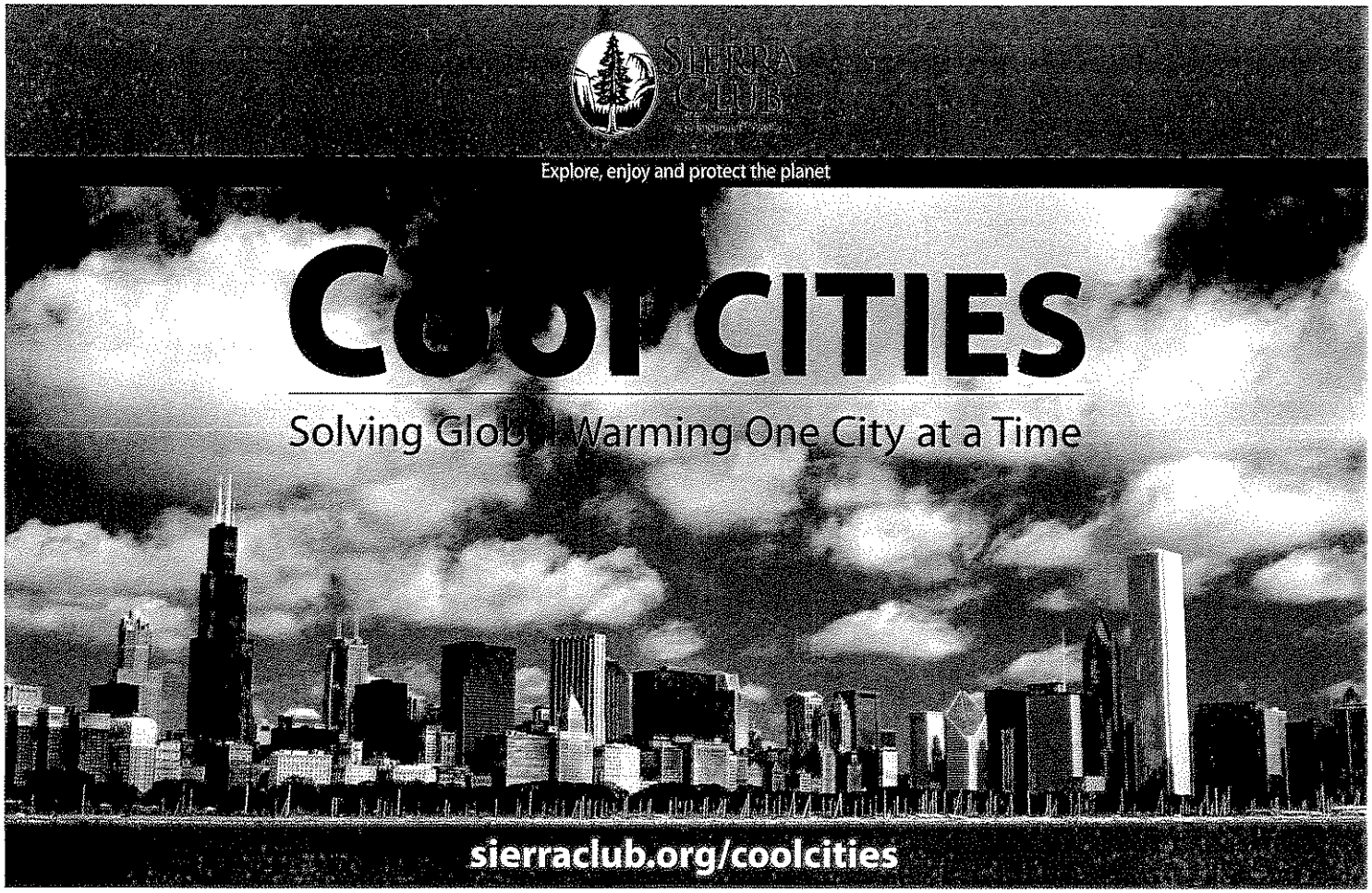
"Despite the Bush administration's resistance to the Kyoto global warming pact, more than 130 U.S. mayors have applied the agreement's standards in a bid to reduce America's carbon dioxide emissions."
—ABC News, May 16, 2005

"Between them they represent almost 29m citizens spread across 35 states. But they are joined by the idea that even if the federal government will not sign-up to Kyoto, a difference can be made at a local level. Across the country, the shift in policies... is already underway."
—The New Zealand Herald, May 17, 2005

Others

"Even the states are not as accelerated as the cities. I know where the power is, and I know it's with you guys."
—New Mexico Gov. Bill Richardson speaking to mayors about climate initiatives


ADDITIONAL WEST COAST CITIES
ROHNERT PARK, CA
COTATI, CA
LOS ALTOS HILLS, CA
SAUSALITO, CA
CLOVERDALE, CA
WINDSOR, CA
SONOMA, CA
NOVATO, CA
DEL MAR, CA
SAN RAFAEL, CA
PLEASANTON, CA
ADDITIONAL EAST COAST CITIES
WASHINGTON, DC
WEST ORANGE, NJ
EASTON, CT
HOPEWELL, NJ
HIGHTSTOWN, NJ
STRATFORD, CT
WEST WINDSOR, NJ
NEW BEDFORD, MA
MANCHESTER, NH
ROBBINSVILLE, NJ
MANSFIELD, CT
SOMERVILLE, MA
FAIRFIELD, CT
LONG HILL TWP, NJ
BRICK, NJ
ALBANY, NY
CLOSTER, NJ
IRVINGTON, NY
RINGWOOD, NJ
EWING, NJ
HULL, MA
HOPEWELL TWP, NJ
MAPLE SHADE, NJ
SYRACUSE, NY
BELLINGHAM, WA
EVERETT, WA
EDMONDS, WA
BAINBRIDGE ISLAND, WA
SHORELINE, WA
SEATTLE, WA
BURIEN, WA
AUBURN, WA
TACOMA, WA
LYNNWOOD, WA
KIRKLAND, WA
LAKE FOREST PARK, WA
REDMOND, WA
SAMMAMISH, WA
ISSAQUAH, WA
RENTON, WA
LACEY, WA
OLYMPIA, WA
CORVALLIS, OR
ASHLAND, OR
ARCATA, CA
VALLEJO, CA
RICHMOND, CA
SEBASTOPOL, CA
SANTA ROSA, CA
PETALUMA, CA
BERKELEY, CA
OAKLAND, CA
SAN FRANCISCO, CA
SAN BRUNO, CA
SAN MATEO, CA
PALO ALTO, CA
SANTA CRUZ, CA
CAPITOLA, CA
VANCOUVER, WA
PORTLAND, OR
LAKE OSWEGO, OR
EUGENE, OR
HEALDSBURG, CA
WEST SACRAMENTO, CA
SACRAMENTO, CA
STOCKTON, CA
ALBANY, CA
SAN LEANDRO, CA
DUBLIN, CA
HAYWARD, CA
FREMONT, CA
SAN JOSE, CA
MORGAN HILL, CA
MORRO BAY, CA
SAN LUIS OBISPO, CA
ATASCADERO, CA
SANTA BARBARA, CA
MOORPARK, CA
THOUSAND OAKS, CA
SANTA MONICA, CA
WEST HOLLYWOOD, CA
LOS ANGELES, CA
LONG BEACH, CA
LAKEWOOD, CA
CERRITOS, CA
BURBANK, CA
MONTEREY PARK, CA
IRVINE, CA
ALISO VIEJO, CA
TUCSON, AZ
ANSCONDA, MT
BILLINGS, MT
SALT LAKE CITY, UT
PARK CITY, UT
MOAB, UT
BOULDER, CO
ASPEN, CO
DENVER, CO
TELLURIDE, CO
LAS VEGAS, NV
ALBUQUERQUE, NM
CAPITAN, NM
RUIDOSO, NM
LAS CRUCES, NM
ANCHORAGE, AK
KAUAI, HI
HONOLULU, HI
MAUI, HI
HILO, HI
http://www.seattle.gov/mayor/climate
AS OF JULY 28, 2006 275 MAYORS HAVE RESPONDED TO MAYOR NICKELS' CHALLENGE TO ADOPT THE GOALS OF THE KYOTO PROTOCOL



COOL CITIES TAKE THE LEAD

Communities all over America are responding to the threat of global warming with smart energy solutions. These "Cool Cities" are taking decisive action to reduce heat-trapping emissions, lower energy bills, save taxpayer dollars, and protect our environment.

At a time when the federal government is failing to act, mayors and other local leaders are taking the lead to curb global warming. Beginning with Seattle Mayor Greg Nickels, more than 200 mayors representing 42 million Americans in 38 states have signed the U.S. Mayors Climate Protection Agreement to reduce global warming carbon dioxide (CO_2) pollution in their cities to 7 percent below 1990 levels by 2012 (see **seattle.gov/mayor/climate**).

These Cool Cities are working to meet this goal with practical and innovative energy solutions that reduce energy waste and pollution, and thereby cut our dependence on oil, benefit public health, and save money.

GLOBAL WARMING: NOW IS THE TIME TO ACT

Scientists have concluded that burning fossil fuels—like oil, coal, and natural gas—to power our cars, homes, and businesses is causing global temperatures to rise. This heating of the earth poses a serious threat to our health, safety, economy, and environment.

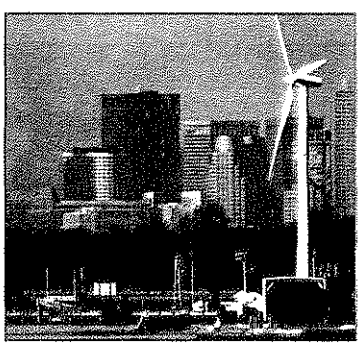
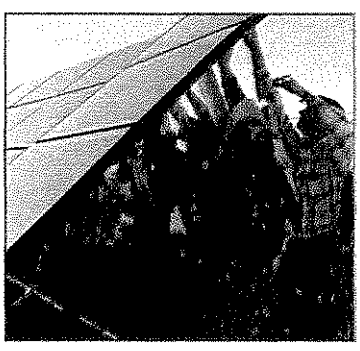
The good news is that we have the tools today to reduce global warming pollution, and cities of all sizes are pursuing innovative energy solutions.

While every city's energy solutions plan will be unique, there are three key common Cool City strategies: **Green Vehicle Fleets, Energy Efficiency,** and **Renewable Energy**.

GREEN VEHICLE SOLUTIONS

The biggest single step we can take to curb global warming is making our cars, trucks, and SUVs go farther on a gallon of gas. Many cities are cutting their global warming emissions by purchasing gas-electric hybrid cars and SUVs for their city vehicle fleet.

By using less gasoline, hybrid vehicles release a fraction of the global warming and

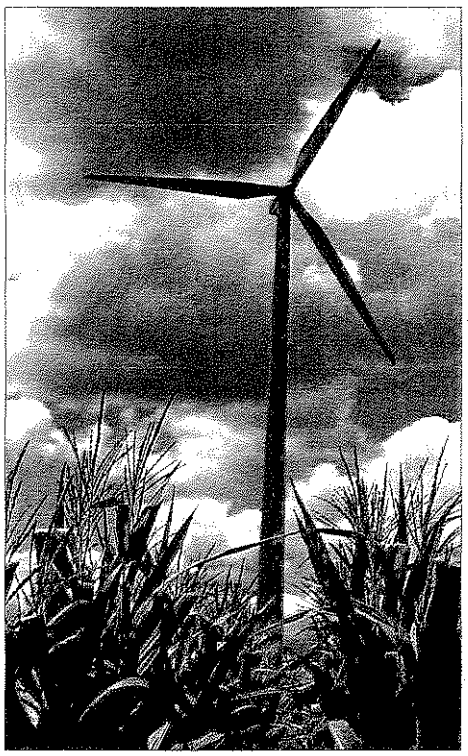




air pollution emitted by conventional vehicles while saving money at the gas pump. Some cities are also providing incentives, such as free parking and lower registration fees, to encourage the purchase of hybrids by local residents and businesses.

ENERGY EFFICIENCY SOLUTIONS

Energy efficiency means using less energy through better technology to light streets and power buildings and industrial facilities. Reducing energy use is one of the most cost-effective and fastest ways to meet our energy needs. Lowering energy costs enables communities to invest more in schools, job creation, and new infrastructure.

Since fossil fuel power plants account for more than one-third of U.S. global warming emissions, saving energy also means less pollution. From high-tech interior and street lighting, energy-efficient building standards and retrofits, to efficient combined heat-and-power, cities in every region of the country are modernizing lighting, heating, cooling, and other systems.



Clean Harvest: Waverly Light & Power in Iowa has installed wind turbines on land leased from local farmers, creating clean electricity for the city and additional income for farmers.

Cool Mayor: *Mayor Joseph Adams, of University City, Missouri, accepts the Sierra Club's Cool City award for signing the U.S. Mayors Climate Protection Agreement.*

RENEWABLE ENERGY SOLUTIONS

Cities across the nation are investing in clean and renewable power like solar and wind energy to lower global warming emissions and create a reliable source of safe, homegrown electricity.

Many cities are adopting "renewable energy standards" that require a specific percentage of the electricity sold in a city or utility area to come from renewable sources by a specific target date.

Other cities are incorporating renewable energy technologies, such as solar photovoltaic panels, into the design of public buildings. Renewable power and energy efficiency are essential solutions for replacing electricity from dirty, fossil-fuel-burning power plants.

COOL CITIES: BRINGING COMMUNITIES TOGETHER

The most successful Cool Cities are engaging the entire community to help meet the goals of the U.S. Mayors Climate Protection Agreement. Local businesses, builders, faith groups, environmentalists, and labor unions are working together to make their cities more livable and vibrant while lowering energy bills, creating good jobs, and tackling a global problem.

RE-ENERGIZING YOUR CITY

As the news of successful city solutions spreads, more cities are joining in the Cool Cities movement to lead our country and our world into a new energy future. Cool Cities are literally re-energizing our nation, proving that we can solve global warming one city at a time.

Now it's your city's turn.

COOL CITIES

TAKE ACTION: BECOME A COOL CITY

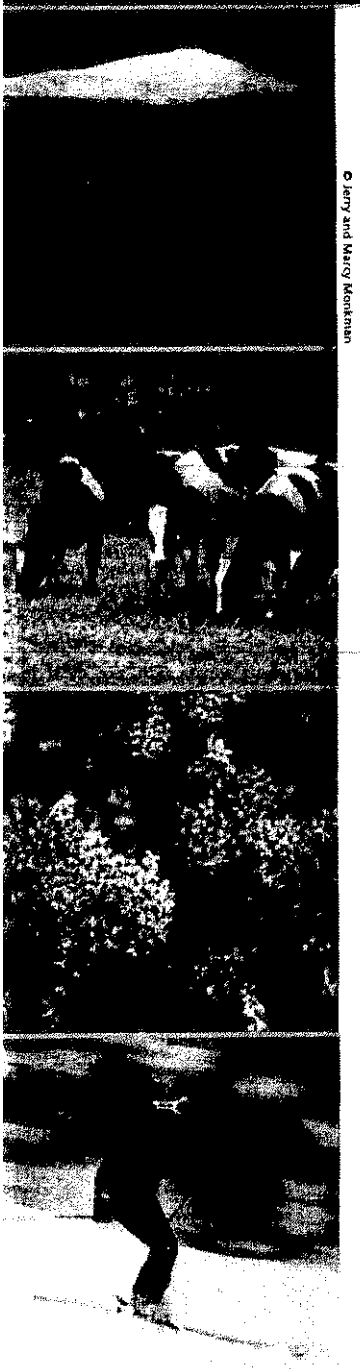
1. Join the U.S. Mayors Climate Protection Agreement to reduce global warming pollution.
2. Green your city's vehicle fleets with hybrid and other cleaner cars.
3. Modernize city buildings with money-saving energy-efficiency technology.
4. Invest in clean and safe renewable energy.

LEARN MORE:

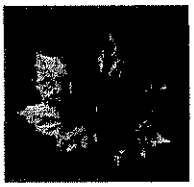
For a list of cities that are becoming "cool," and for resources and specific examples of smart energy city solutions and model action plans, go to **sierraclub.org/coolcities**.

Global Warming in New Hampshire

OUR CLIMATE, ECONOMY, AND HEALTH



© Jerry and Marcy Monkman



Brilliant fall foliage stretches from the Merrimack Valley to the Great North Woods. Deep winter snows blanket the Presidential Range. Hikers and skiers flock to the White Mountains, while boating and fishing provide family recreation in the Lakes Region. The people of New Hampshire derive their sense of place from the Granite State's unique landscapes and the rhythms of its climate.

Global warming is already affecting New Hampshire's climate.

However, changes in New Hampshire's climate brought about by global warming are beginning to affect New Hampshire's way of life—from tourism to economic opportunity and health care costs. To help ensure our children inherit a state that supports a high quality of life and rich opportunities, it is important to understand the causes and direction of climate trends, as well as the practical and responsible steps New Hampshire can take in the next few years to help avoid many of the unfavorable consequences of global warming.

Climate Trends

In New England everyone jokes about the fickle weather. Although there is some natural variation in the weather every year, over longer time periods we see climate trends emerge. If you grew up in New Hampshire, you probably remember winters being longer and snowier. In the northeast United States, the average annual temperature has increased by 1.8°F over the last century. Even more striking, New England's average winter (December to February) temperature has increased 4.4°F over the last 30 years.

These temperature changes are affecting the region's plants, animals, and environment. For example, the average snow cover season has decreased by more than 15 days compared with 30 years ago, and the New Hampshire state flower, the purple lilac, now blooms four days earlier.

Much of this warming is caused by emissions, primarily carbon dioxide (CO_2), that blanket the earth and trap heat. The main source of excess CO_2 is the burning of coal, oil, and natural gas to generate electricity

Warming Trend Consequences

Indicator	Trends	Years Observed
Days with Snow on the Ground*	16 fewer days	31
Snowfall†	Decreased 10–60 inches	30
River Ice Breakup*	11 days earlier	64
Lake Winnipesaukee Ice Breakup†	8 days earlier	204
Lilac Bloom Date*	4 days earlier	36
Precipitation*	8% increase	100
Growing Season Length*	8 days longer	101

*New England †New Hampshire

Source: Indicators of Climate Change in the Northeast, Markham and Wake 2005.
Photo (middle): Courtesy of the National Weather Service

and drive our cars. If we continue to generate large quantities of CO_2 and other heat-trapping gases, we can expect an average temperature increase for the northeastern United States of between five and nine degrees Fahrenheit by 2100. To place these projections in perspective, the average global temperature has increased 1.1°F over the last century. Fortunately there are sensible and affordable solutions available today to help us reduce our heat-trapping emissions and preserve our quality of life.

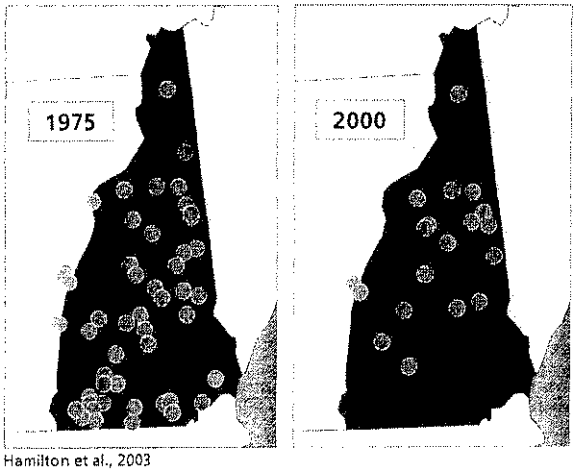
What's at Stake

Ski Industry

Since 1930 the ski industry has been an important part of New Hampshire's economy. Skiing provides critical jobs in small towns and pumps more than $650 million into the New Hampshire economy. The ski industry is already suffering from shorter ski seasons and increased operating costs attributable to the warming of the past few decades. Since 1970 the number of New Hampshire ski areas dropped steeply, with many southern and lower-elevation resorts closest to population centers going out of business.

In order to survive today, New Hampshire ski areas must produce artificial snow on more than 90 percent of their trails. Snowmaking requires freezing temperatures, access to large local water sources, and intensive infrastructure investments. Rising temperatures mean increased snowmaking, leading to higher operating costs.

New Hampshire Downhill Ski Areas



Hamilton et al., 2003

The effects of global warming are already being felt, as many ski areas (indicated by circles) have gone out of business.

Tourism associated with cross-country skiing, snowshoeing, and snowmobiling will see the earliest effects from global warming because these activities depend on natural snowfall and do not have the option of artificial snowmaking.

Forests

Because forests cover most of New Hampshire, projected changes in forest species will change the character of the state. Sugar maples (*Acer saccharum*), for example, occur exclusively in the northeastern United States and southeastern Canada. Maple sugar production depends on prolonged cold temperatures with freezing nights and warm daytime temperatures to create the optimal sugar content and sap production. With warming under way, the maple sugar industry long associated with New England has already felt some impact. Over the last two decades, the center of maple sugar production has shifted from the United States into Canada.

Global climate models project a substantial northward shift in maple tree distribution. Such shifts in forest vegetation could cause lower elevations in New Hampshire to lose their brilliant fall foliage and resemble instead the brown autumns currently experienced in southern Pennsylvania.

Health Trends Linked to Climate

Today summer storms tracking across Canada clear away pollution in the northeast United States. A recent study looking specifically at global warming and its impact on air quality found that storm frequency is projected to decrease in the region, resulting in air stagnation over much of New England. If future emissions of carbon monoxide and black carbon remain at today's levels, the study showed air stagnation will result in hazardous smog episodes that will increase in both severity and duration by mid-century.

Studies for Boston and Portland already show increases in emergency room visits for respiratory and asthma incidents that correlate with bad air pollution days (specifically, ground-level ozone events). In addition to asthma and respiratory ailments, poor air quality is also harmful to New Hampshire residents with cardiovascular disease.

Currently poor air quality in New Hampshire results in the premature death of more than 100 residents each year, costing the state one billion dollars annually. If global warming increases the frequency and/or severity of dangerous

Asthma, other respiratory ailments, and cardiovascular incidents are linked with bad air pollution days, which are likely to increase as temperatures rise.

air pollution, then air pollution-related health problems will likely increase, compromising the health of many New Hampshire citizens and increasing the state's public health care expenses.

Choices for New Hampshire

There is a great deal that state, regional, and national policy makers can do today to address the root causes of global warming and reduce its effect on New Hampshire's economy, public health, and environment.

A "Model" Region

New Hampshire has already taken the lead by joining other northeastern states in the Regional Greenhouse Gas Initiative (RGGI)—a cooperative effort to establish a program that will reduce CO_2 emissions from power plants much the same way we successfully and quickly reduced acid rain pollution in the 1990s. This flexible "cap and trade" program harnesses the efficiency of the marketplace to achieve pollution reductions in the most cost-effective manner. A successful program for the Northeast not only benefits the region by reducing pollutants but can serve as a national model for federal policy.

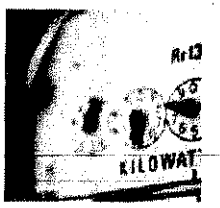
A successful program for the Northeast not only benefits the region but can serve as a national model for federal policy.

Renewable Energy

Renewable energy resources including wind, solar, and bioenergy are now affordable alternatives to the burning of fossil fuels. Policies such as a federal renewable electricity standard, which requires utilities to generate a portion of their electricity from renewable sources, would create jobs and other in-state economic development while reducing air pollution and global warming emissions.

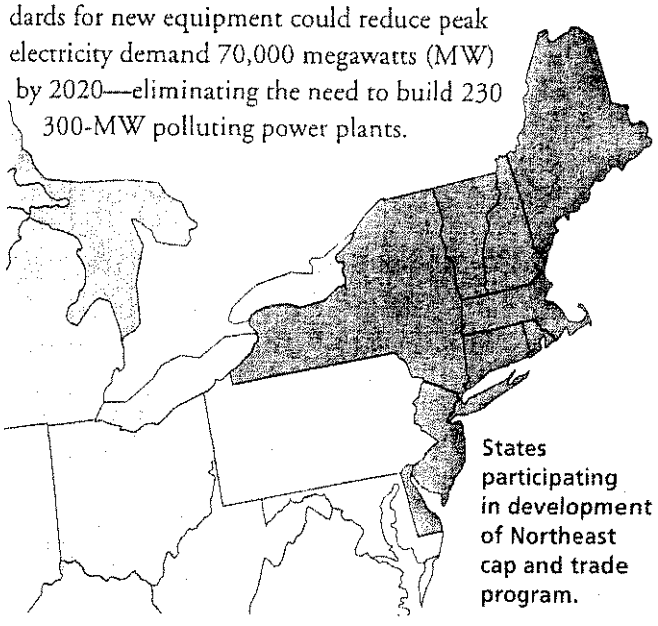
For example, a 10 percent standard—similar to the standard that has passed the U.S. Senate three times—would generate an estimated $12 million in new income for rural landowners and $42 million in new property tax revenue. In addition, New Hampshire consumers would save $70 million on their electricity and natural gas bills by 2020 under a 10 percent standard.

Energy Efficiency



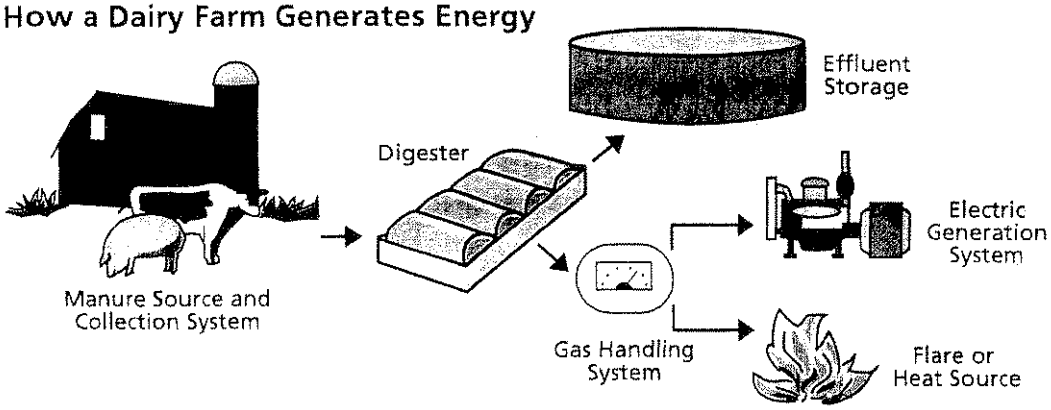
The old "waste not, want not" adage has guided New Englanders for years. Nationally, energy efficiency improvements have helped us keep our per capita energy use almost identical to that of 1973, even though our economic output increased 74 percent in the intervening 30-plus years. These improvements saved consumers at least $430 billion.

But there remains enormous potential for additional cost-effective energy savings. The U.S. Department of Energy (DOE) estimates that energy efficiency solutions are available now to cut national energy use 10 percent by 2010. For example, simply extending tax incentives for energy-efficient equipment and buildings and setting new efficiency standards for new equipment could reduce peak electricity demand 70,000 megawatts (MW) by 2020—eliminating the need to build 230 300-MW polluting power plants.



States participating in development of Northeast cap and trade program.

How a Dairy Farm Generates Energy



New Hampshire has many renewable energy options, such as bio-energy, that reduce our dependence on fossil fuel energy.

Adapted from Ecological Farming Association

Fuel Economy

Because cars and trucks are responsible for almost a quarter of annual U.S. emissions of heat-trapping CO_2, improving vehicle fuel economy (and thereby reducing emissions) should be a key element of climate policy. Fortunately, increasing fuel efficiency is one of the most cost-effective and technologically feasible methods of addressing the threat of global warming while benefiting our economy and protecting public health. Off-the-shelf technology can greatly reduce the amount of gasoline that cars, SUVs, and pickup trucks need without raising costs. For example, increasing fuel economy to an average 40 mpg would cost consumers about $1,000 to $2,000 per vehicle, but would save consumers $3,500 to $6,000 (calculated at two dollars per gallon) on fuel over the life of the vehicle.

A sensible federal policy would therefore increase the average fuel economy of cars, SUVs, and pickup trucks to 40 mpg over the next 10 years. By using existing technology to make more efficient vehicles, Granite State consumers would cut their 2015 gasoline consumption by nearly 50,000 gallons every day, saving $119 million at the gas pump. In addition, 700 new jobs would be created in New Hampshire by 2015.

Moving Forward Responsibly

Because heat-trapping emissions remain in the atmosphere for decades or even centuries, the choices we make today will affect the climate our children and grandchildren inherit. The only responsible approach is to start reducing heat-trapping emissions now. As illustrated above, many solutions exist today that not only help us begin to slow global warming, but will also have immediate benefits for our air quality and economy. Delaying action by even five to ten years will greatly increase the costs of grappling with the problem.

Sensible and affordable solutions are available today to reduce heat-trapping emissions.

In addition to reducing emissions that cause global warming, we can address root causes of air pollution that have public health consequences. We must also prepare to manage those future changes that cannot be avoided. With foresight, planning, and a commitment to responsible management, New Hampshire can be a leader in effective climate solutions.

Union of Concerned Scientists
Citizens and Scientists for Environmental Solutions

Two Brattle Square
Cambridge, MA 02238-9105
(617) 547-5552
ucs@ucsusa.org
www.ucsusa.org

Climate science expert Dr. Brenda Ekwurzel wrote this fact sheet. The climate impacts material in this fact sheet is based on several recently published articles, and much of the solutions information is based on analyses from the Union of Concerned Scientists (UCS).

Dr. Brenda Ekwurzel (202) 223-6133

A fully referenced version is available from UCS at www.ucsusa.org/nhwarming or call (617) 547-5552.

References

Bradbury, J.A., B.D. Keim, and C. P. Wake. (2003) The influence of regional storm tracking and telecommunications on winter precipitation in the northeastern United States, *Annals of the Association of American Geographers*, **93**, 544-556.

Deyette, J. and S. Clemmer, (2004) *Renewing America's Economy*, Union of Concerned Scientists (www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=1505)

Fact Sheet at
http://www.ucsusa.org/clean_vehicles/cars_and_suvs/page.cfm?pageID=221.

Friedman, D., D. Mackenzie, and M. Goldberg. (2004) *Creating jobs, saving energy and protecting the environment: An Analysis of the potential benefits of investing in efficient cars and trucks*, Union of Concerned Scientists, Cambridge, MA, 8p.

Hamilton, L.C., D.E. Rohall, B.C. Brown, G.F. Hayward and B.D. Keim. (2003) Warming winters and New Hampshire's Lost Ski Areas: An Integrated Case Study, *International Journal of Sociology and Social Policy*, **23**, 52-73

Markham A. and C. Wake. (2005) *Indicators of Climate Change in the Northeast*. Clean Air - Cool Planet and The Climate Change Research Center, University of New Hampshire 32pp.

Mickley, L. J., Jacob, D. J., Field, B. D. and Rind, D. (2004). Effects of future climate change on regional air pollution episodes in the United States, *Geophysical Research Letters*, **31**, L24103, doi:10.1029/2004GL021216

National Assessment Synthesis Team. (2001). *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*, Report for the US Global Change Research Program, Cambridge University Press, Cambridge UK, 620 pp.

New Hampshire Department of Environmental Services. (2004) *Air Pollution Transport and How it Affects New Hampshire*, R-ARD 04-1, 107p.

Peng R.D., F. Dominici, R. Pastor-Barriuso, S.L. Zeger, and J.M. Samet. (2005) Seasonal Analysis of Air Pollution and Mortality in 100 US Cities, *American Journal of Epidemiology*, **161**, 585-594.

Ski NH 2001-02 economic impact study.

Wilson, A.M., C.P. Wake, T. Kelly, J.C. and Salloway. (2004) Air pollution, weather, and respiratory emergency room visits in two northern New England cities: an ecological time-series study, *Environmental Research*, **97**, 312-321.